Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

FIRST SEMESTER M.TECH (ASTRONOMY & SPACE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: FUNDAMENTALS OF SPACE SCIENCE [ICE 507]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.	Explain Copernican theory of the solar system.	**3**
1B.	What are the characteristics that a celestial body should possess in order to be placed in the category of planets? Why Pluto is not considered a planet?	**3**
1C.	What is the Oort and Kuiper belt made of? Where are they present?	**4**
2A.	What is Nebula? Categorize them and briefly explain about each of them.	**5**
2B.	The sun's centre is at one focus of earth orbit. How far is the other focus? The eccentricity of earth's orbit is 0.0167 and the semi-major axis may be taken as 1.5×10^{11}m.	**2**
2C.	An asteroid headed directly towards earth has a speed of 12 km/s relative to the earth when it is at a distance of 10 earth radii from earth's centre. Ignoring the effects of terrestrial atmosphere and assuming energy conservation during fall, find the asteroid speed when it reaches earth's atmosphere.	**3**
3A.	Explain the importance of Virial theorem with suitable expressions.	**3**
3B.	Derive the Compton scattering formula.	**4**
3C.	What is plasma? Explain the plasma characteristics?	**3**
4A.	Derive an expression for photon energy density.	**4**
4B.	State Bernoulli's principle and obtain Bernoulli's equation.	**3**
4C.	Explain self-similar approach employed to study the gravitational collapse of a star with equations.	**3**
5A.	Briefly explain the internal equilibrium conditions of a star.	**4**
5B.	Describe the steps in the proton-proton cycle.	**3**
5C.	Illustrate the evolution of a sun-like-star with the help of H-R diagram.	**4**
6A.	With a suitable diagram, explain the Hubble classification of galaxies.	**3**
6B.	What are Fraunhoffer lines? What is their importance?	**3**
6C.	Briefly explain the solar terrestrial effects.	**4**